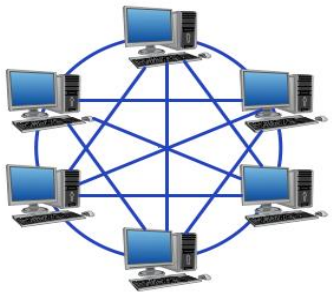
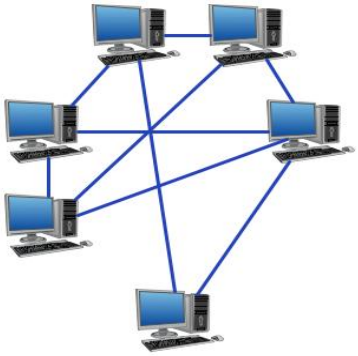
CN Diagrams

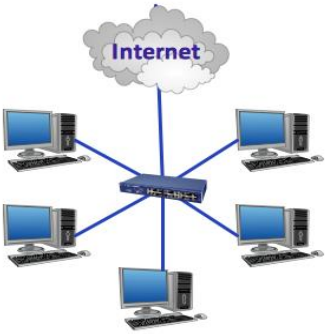
Module-1



Fully Connected Network Topology

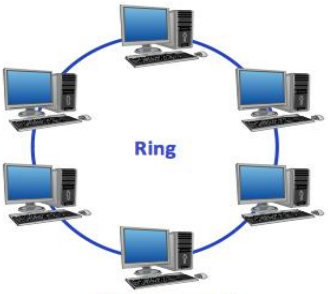


Mesh Network Topology



Star Network Topology

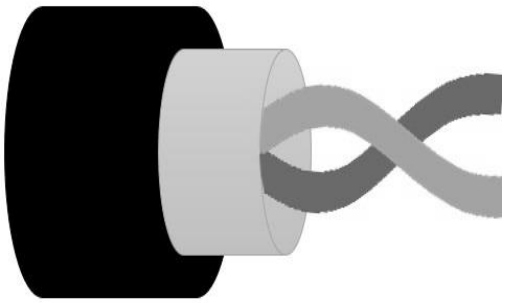
Common Bus Topology



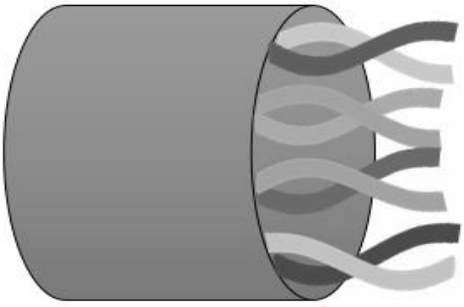
Ring Network Topology

Module-2

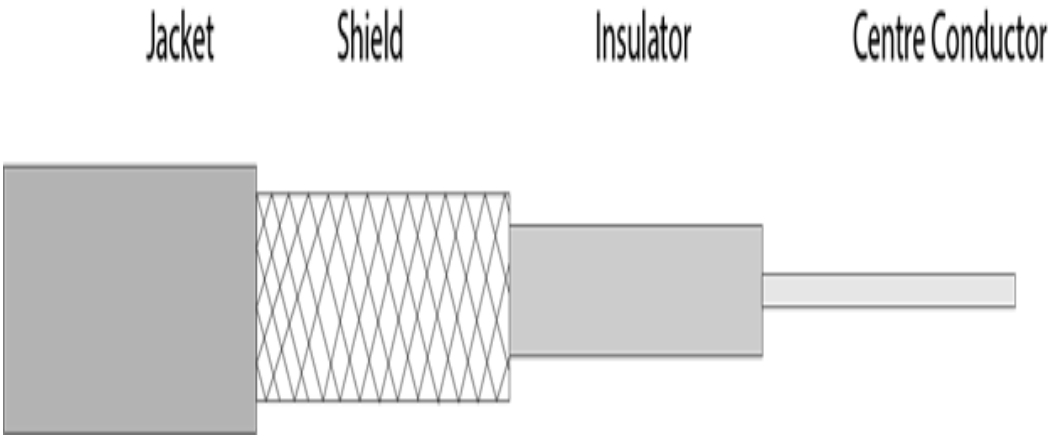
Shielded Twisted Pair Cable

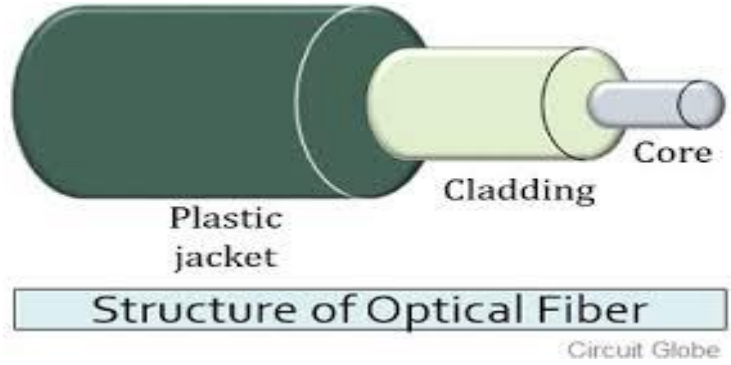


Unshielded Twisted Pair Cable



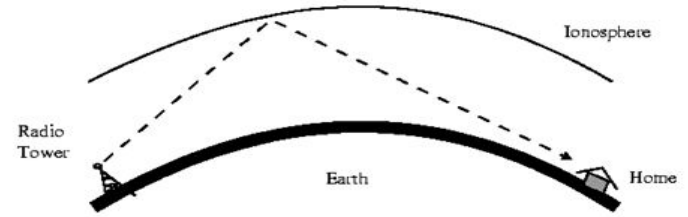
Coaxial cable



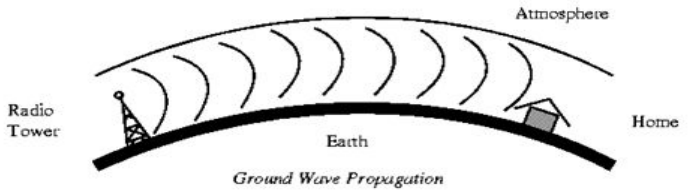


Structure of Optical Fiber

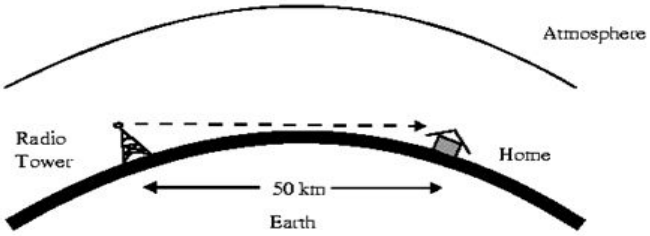
Circuit Globe



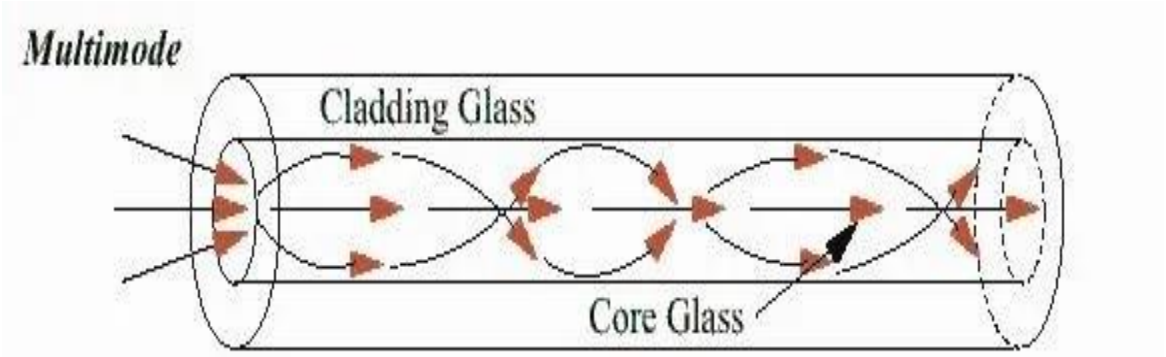
skywave

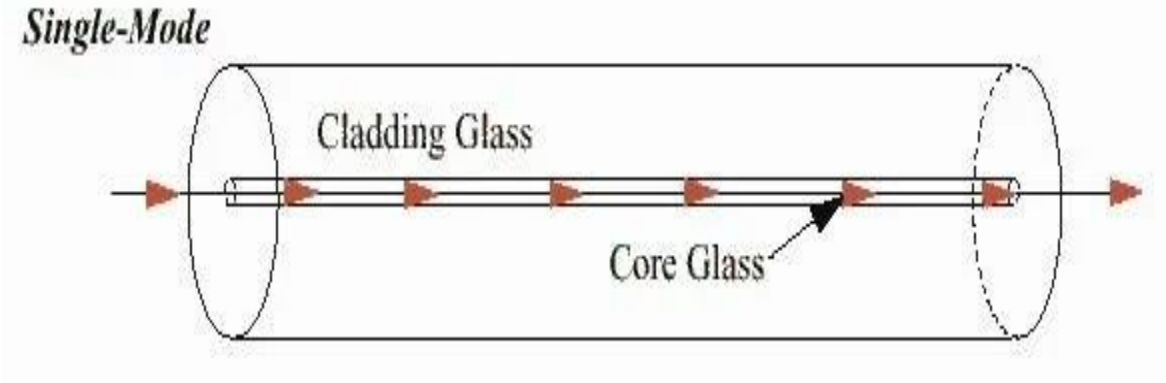


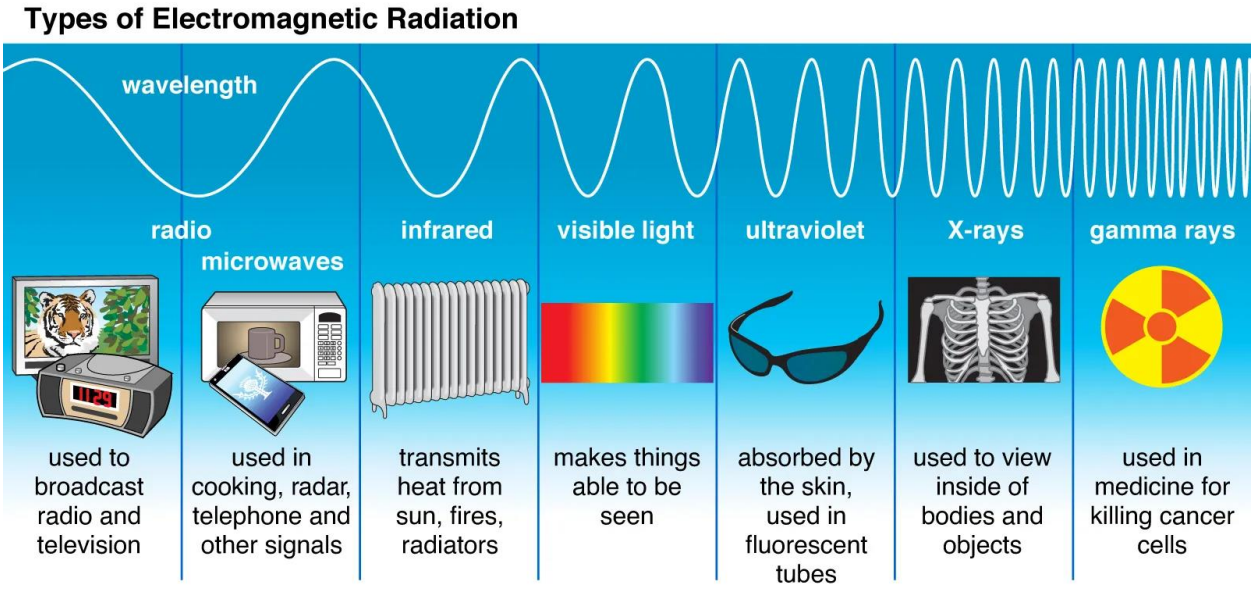
groundwave



line-of-sight

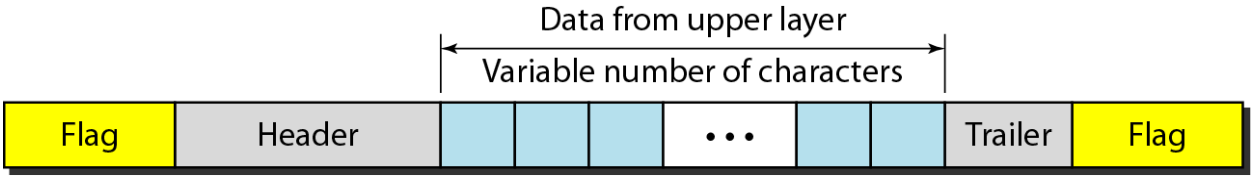




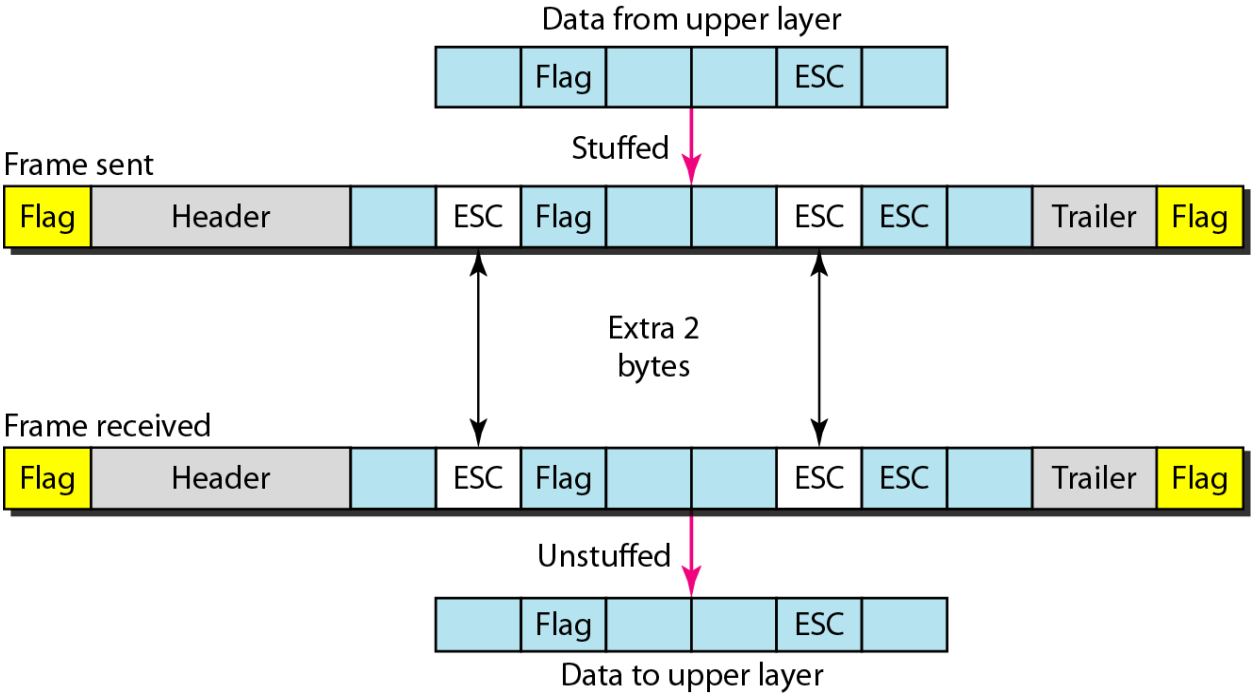


Module-3

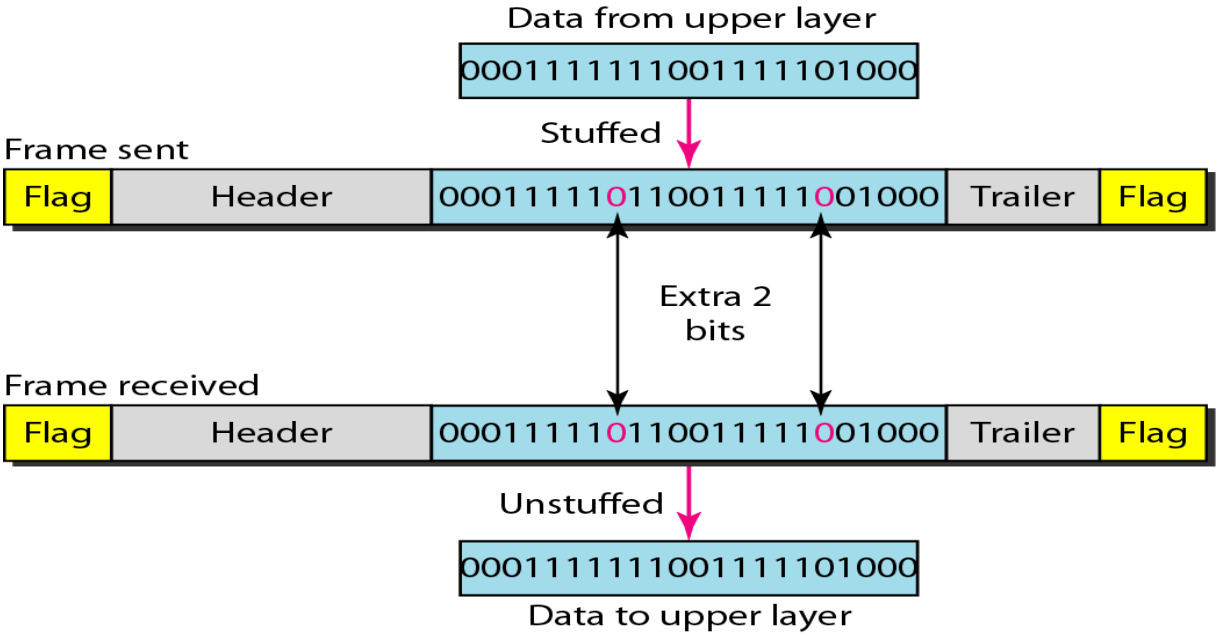
A frame in a character-oriented protocol



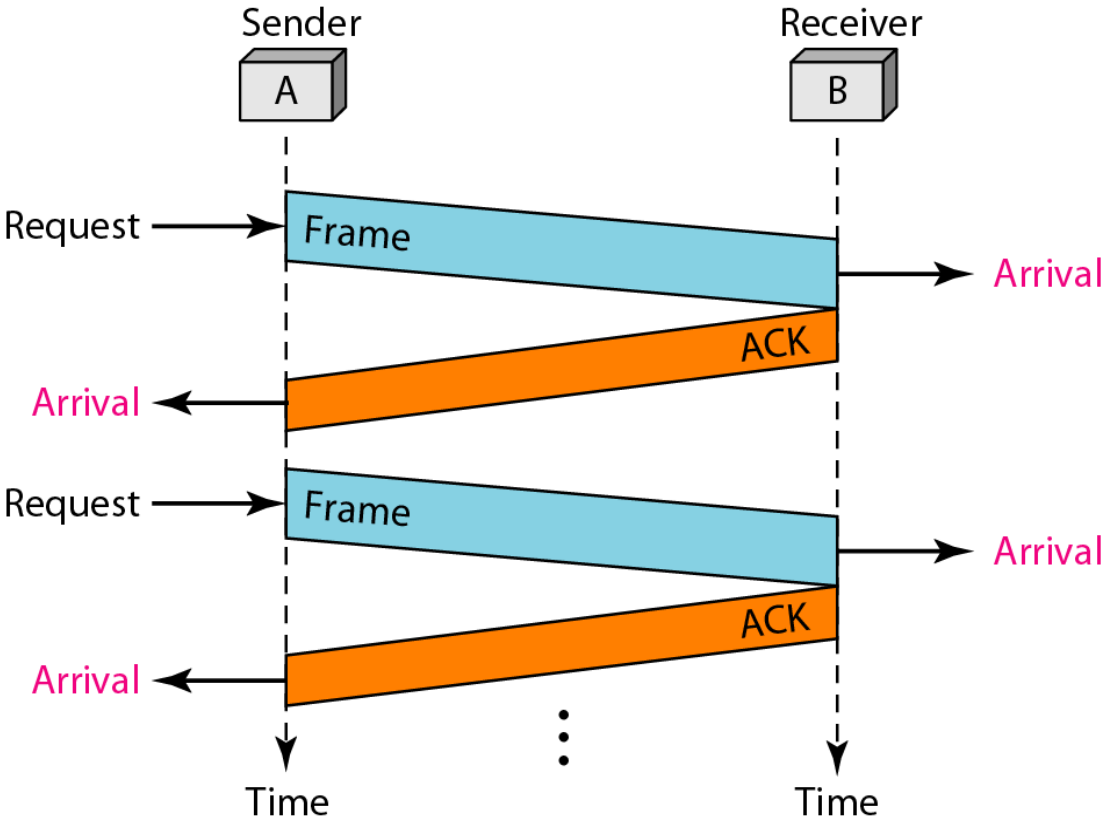
Byte stuffing



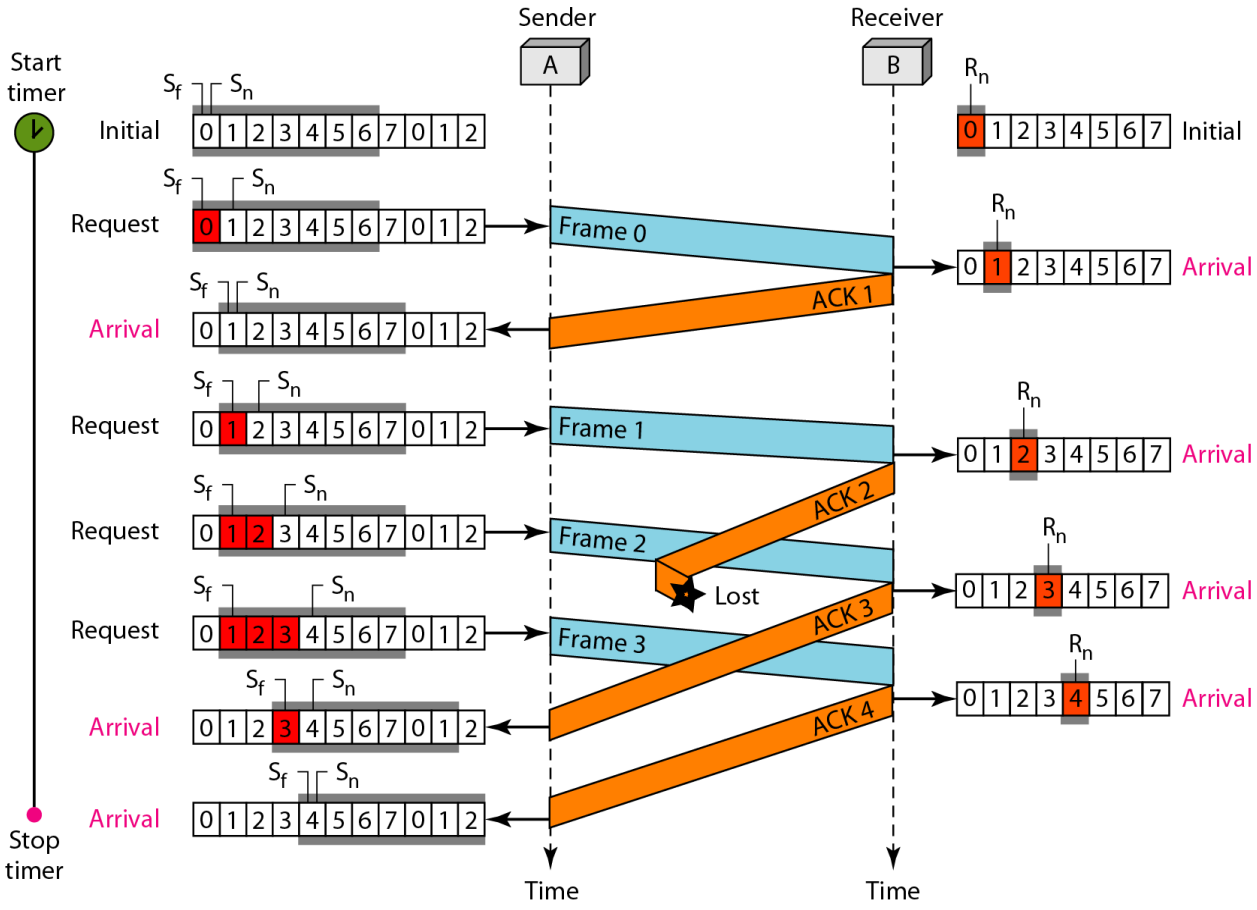
Bit stuffing and unstuffing

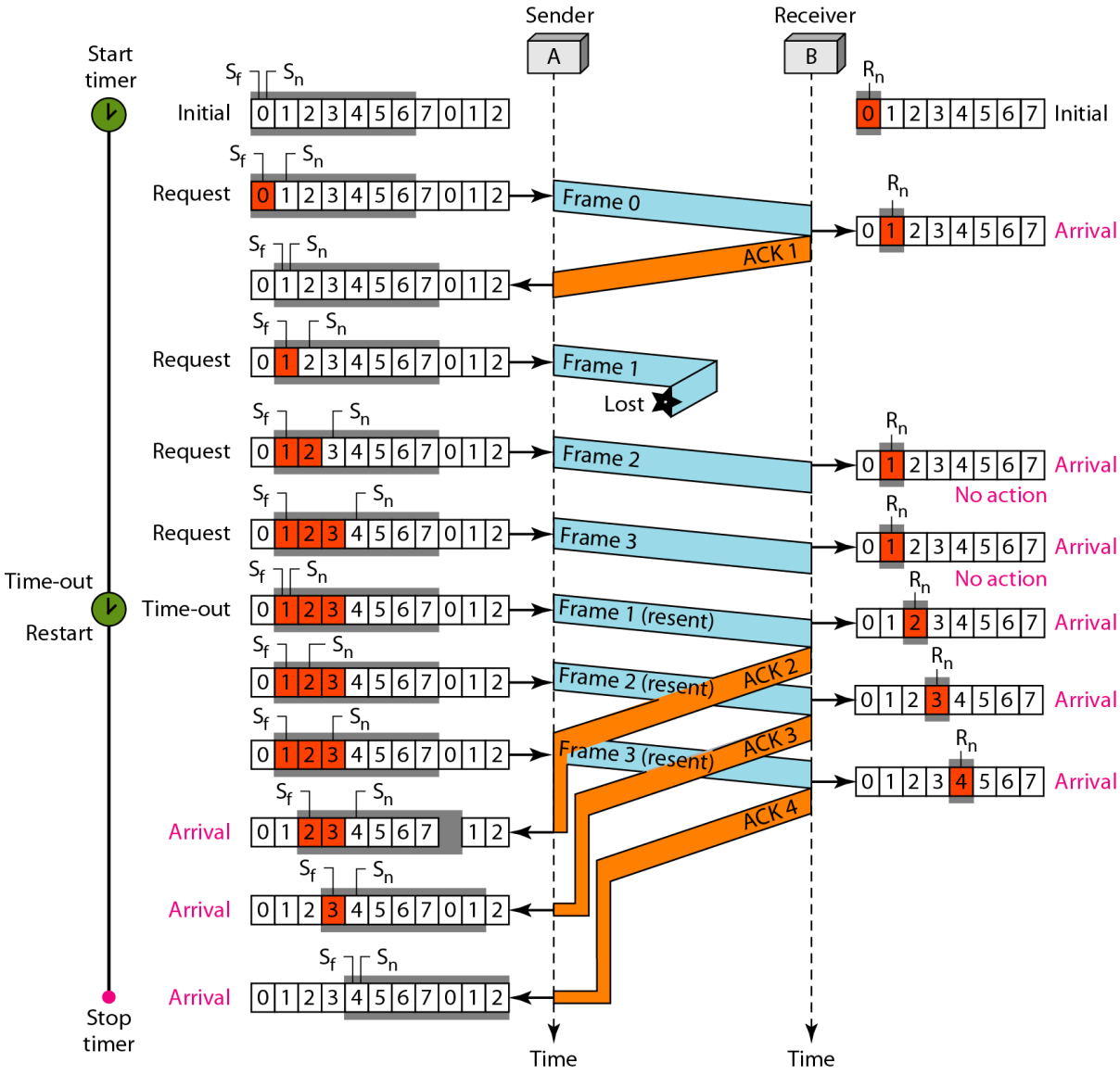


Stop-and-Wait Protocol

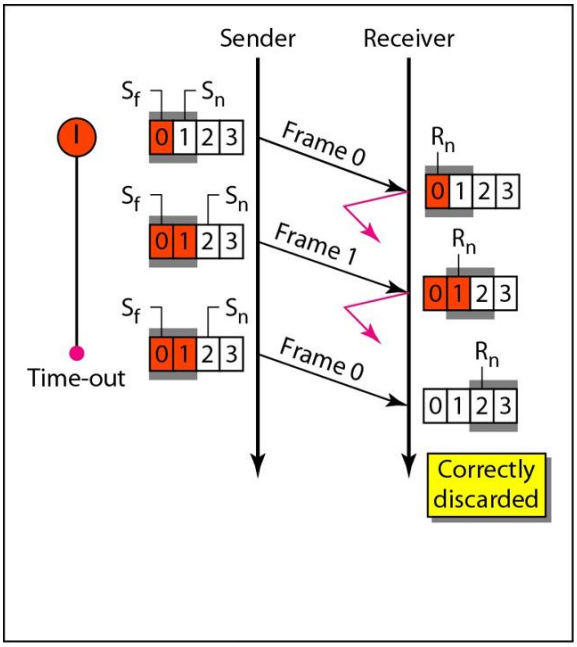


Go-Back-N ARQ

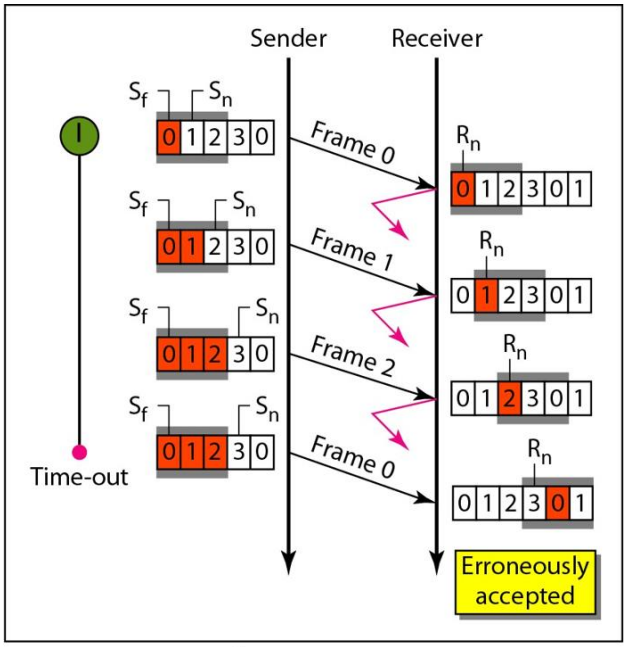

Sender
Receiver
A
B
Start timer
Stop timer
Initial
Request
Arrival
Frame 0
Frame 1
Frame 2
Frame 3
ACK 1
ACK 2
ACK 3
ACK 4
Lost
Time
Time


Sender
Receiver
A
B
Start timer
Initial
Request
Frame 0
ACK 1
Arrival
Request
Frame 1
Lost
Request
Frame 2
Arrival
No action
Request
Frame 3
Arrival
No action
Time-out
Time-out
Restart
Frame 1 (resent)
Arrival
Frame 2 (resent)
ACK 2
Arrival
Frame 3 (resent)
ACK 3
Arrival
ACK 4
Arrival
Arrival
Stop timer
Time
Time

Selective Repeat ARQ

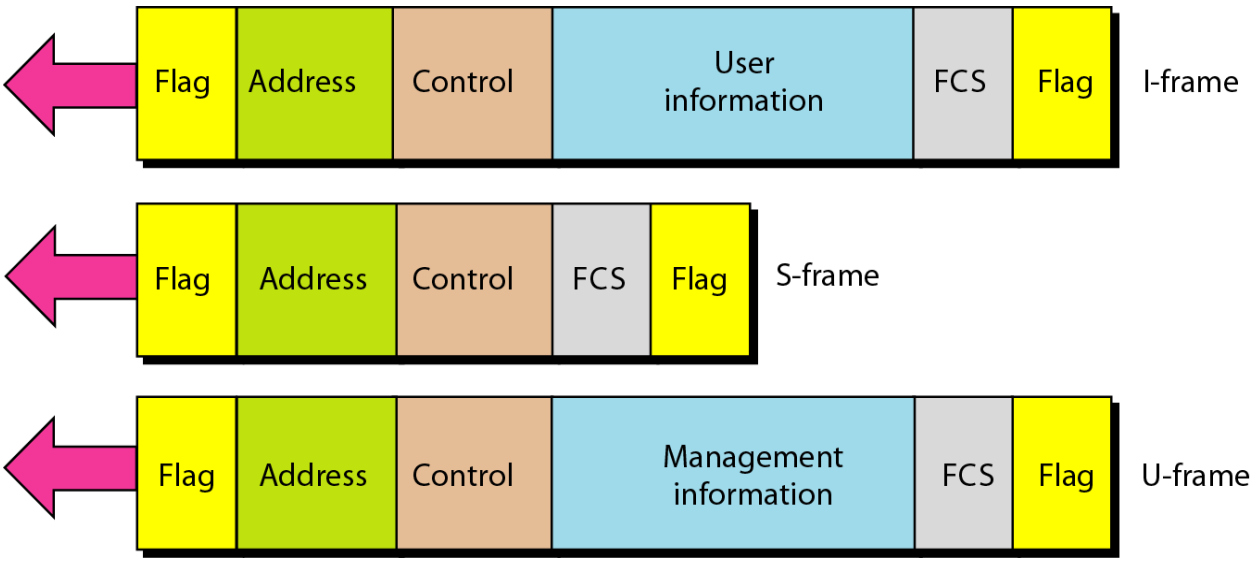


a. Window size = 2^{m-1}

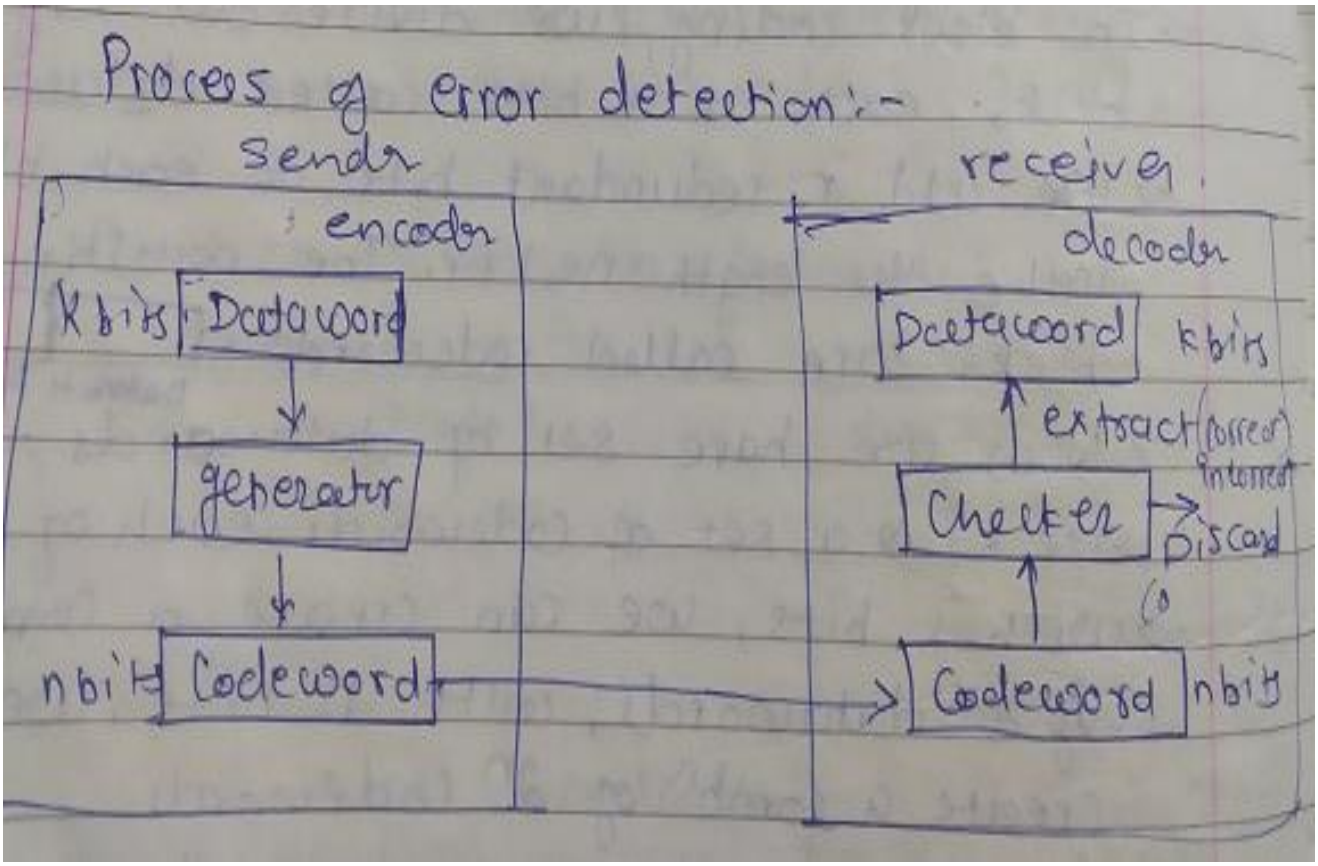


b. Window size > 2^{m-1}

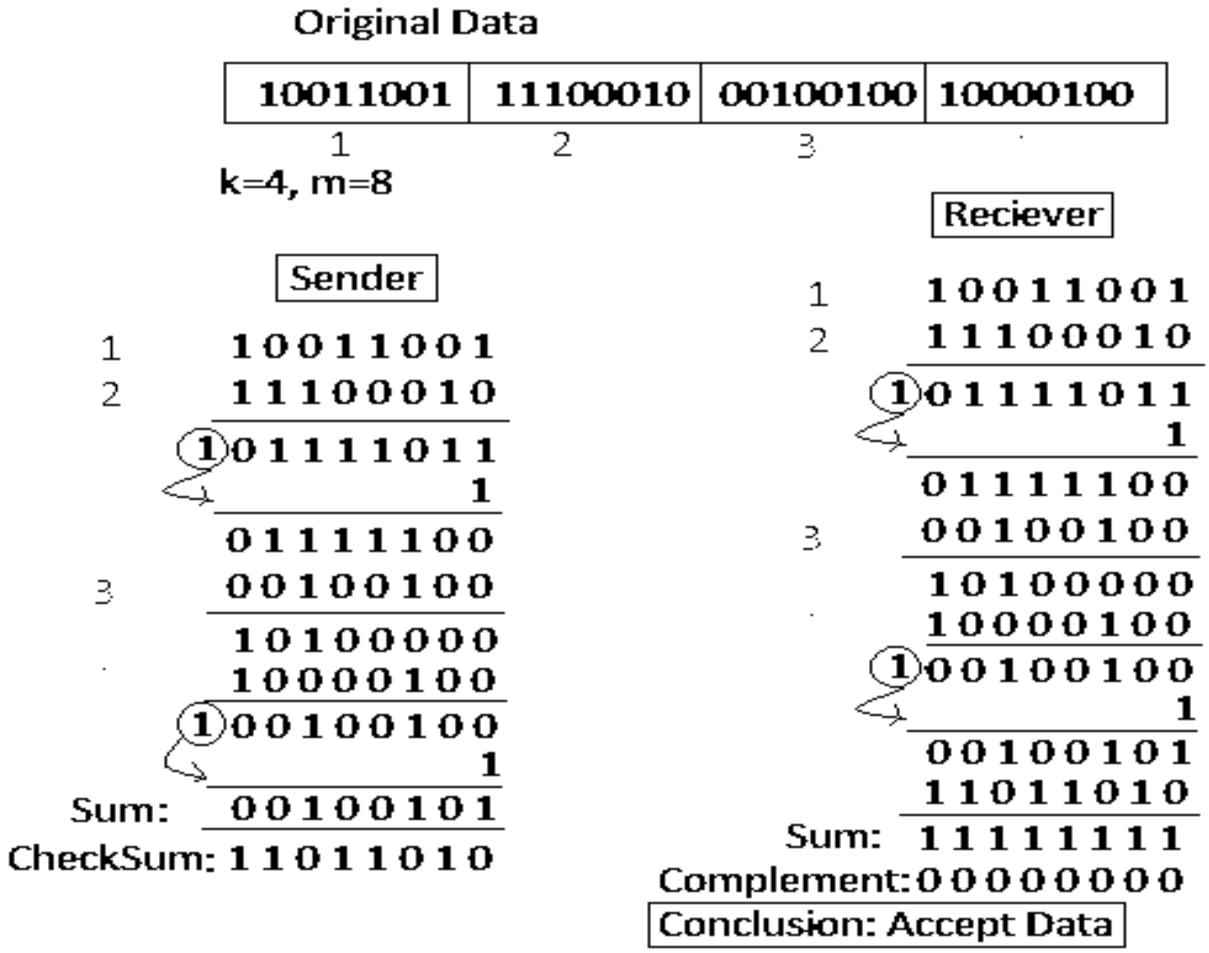
HDLC frames



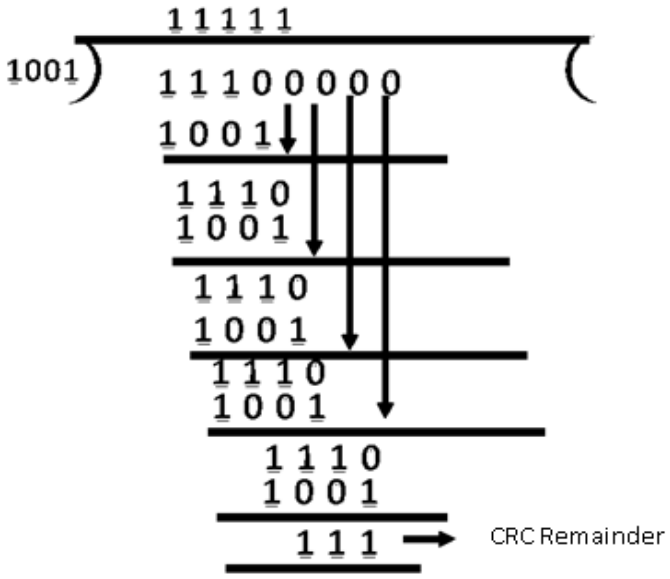
Working of error detection

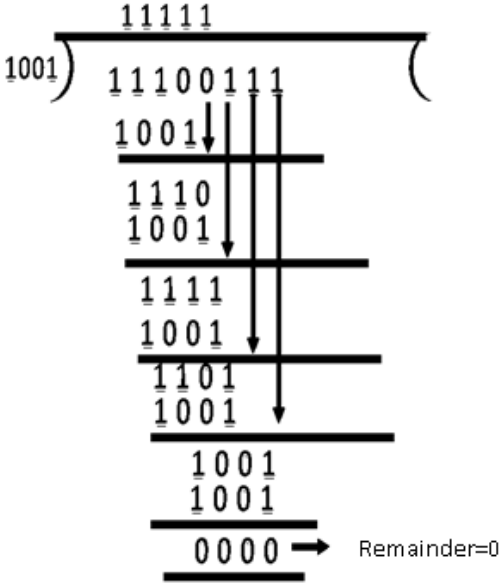


Checksum


Original Data
10011001
11100010
00100100
10000100
1
2
3
k=4, m=8
Sender
1 10011001
2 11100010
1 01111011
1
01111100
3 00100100
10100000
10000100
1 00100100
1
Sum: 00100101
CheckSum: 11011010
Reciever
1 10011001
2 11100010
1 01111011
1
01111100
3 00100100
10100000
10000100
1 00100100
1
00100101
11011010
Sum: 11111111
Complement: 00000000
Conclusion: Accept Data

CRC





Hamming code

Fig. 5.22 a) 7-bit hamming code C(7,4)

Fig. 5.22 b) 15-bit hamming code C(15,11)

Step 1: The codeword format:

Given data bit = 1011

D7=1	D6=0	D5=1	P4	D3=1	P2	P1

P4, P2 and P1 is to be decided.

Step 2: Decide P1:

For P1, sections to be considered are 1,3,5,7

Here, we have to set P1=1 as 3,5,7=111 in order to have the even parity.

D7=1	D6=0	D5=1	P4	D3=1	P2	P1=1

Step 3: Decide P2

For P2, sections to be considered are 2,3,6,7

Here, we have to set P2=0 as 3,6,7=101 in order to have the even parity.

D7=1	D6=0	D5=1	P4=0	D3=1	P2=0	P1=1

Thus, the code word which is transmitted to the receiver = 1010101

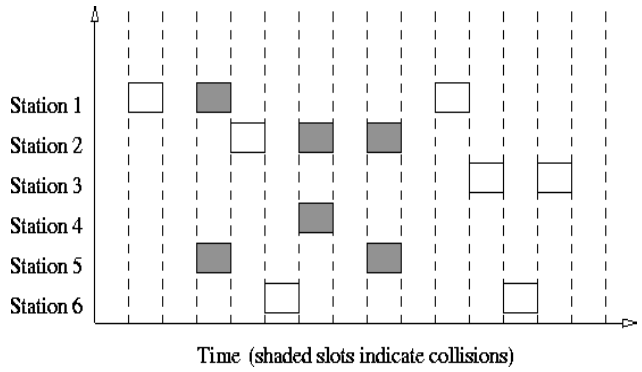
D7=1	D6=0	D5=1	P4	D3=1	P2=0	P1=1

Step 4: Decide P4

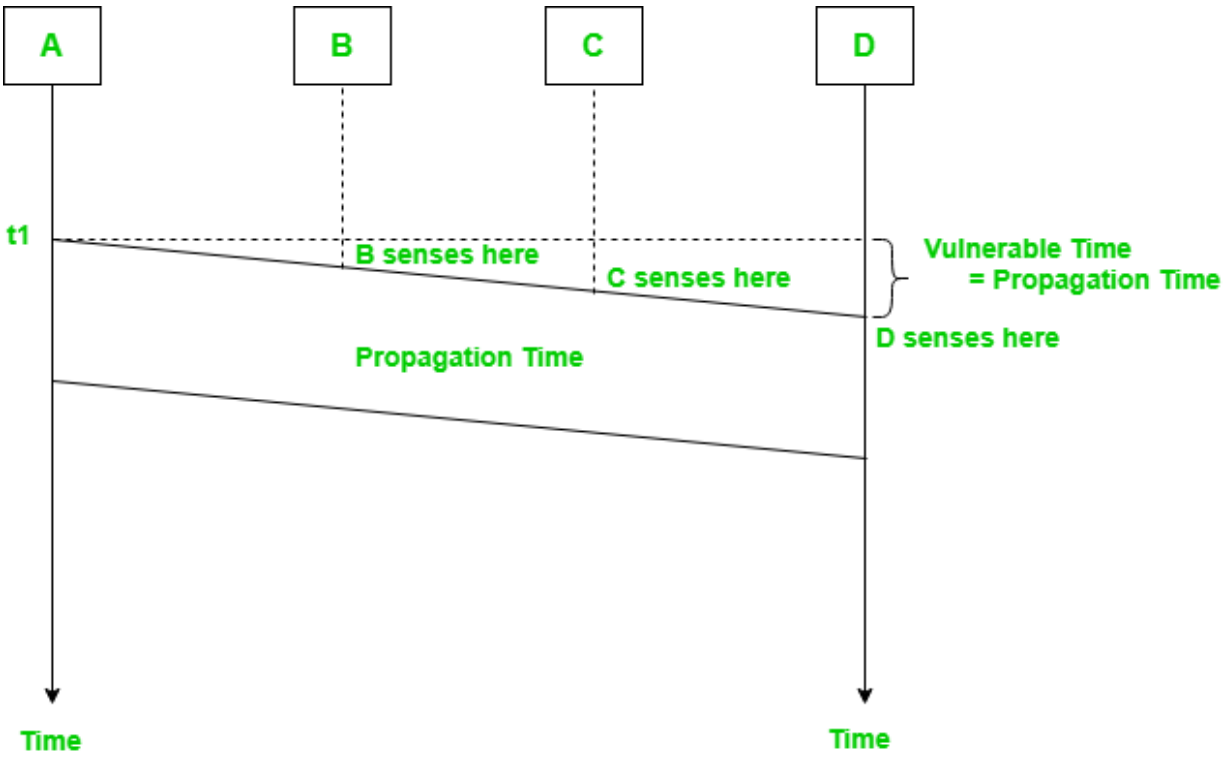
For P4, sections to be considered are 4,5,6,7

Here, we have to set P4=0 as 5,6,7=101 in order to have the even parity.

Pure and slotted aloha

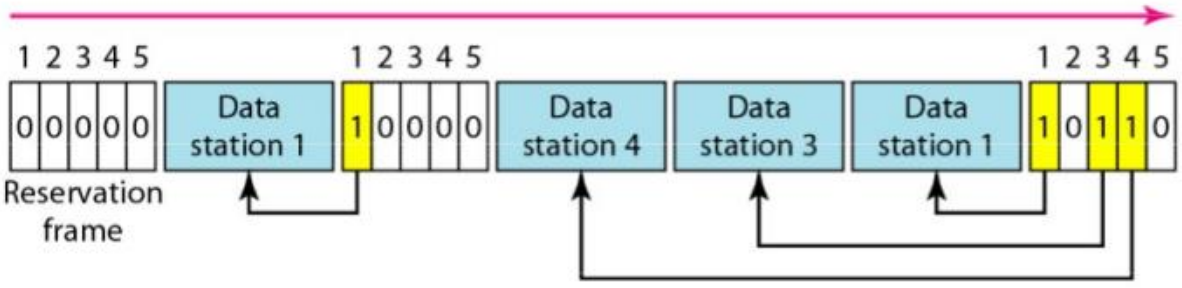


Csma

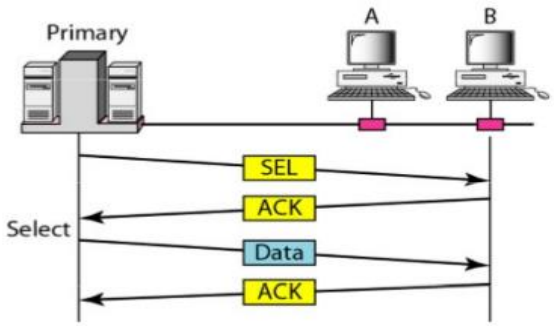


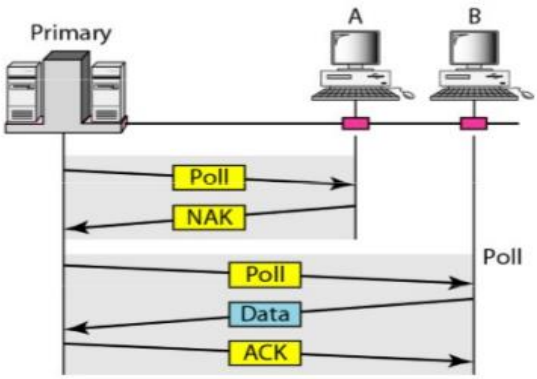
Controlled access

Reservation

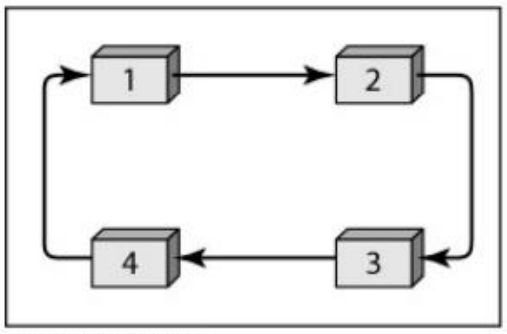


Polling

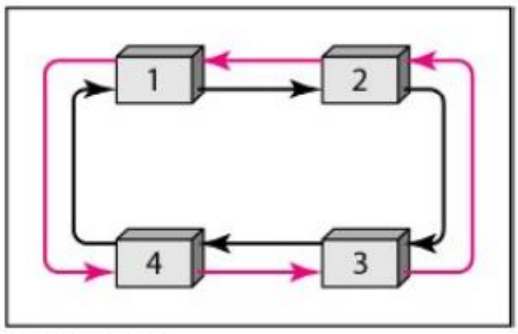




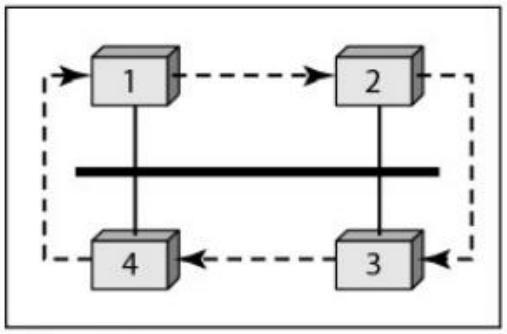
Token passing



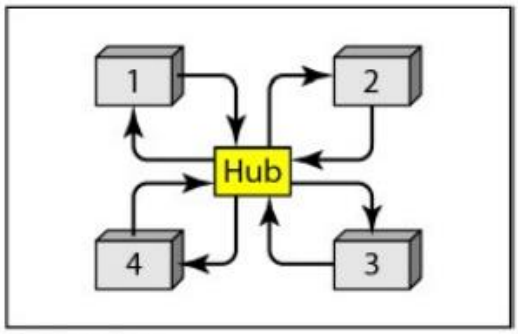
a. Physical ring



b. Dual ring



c. Bus ring



d. Star ring

Module-4

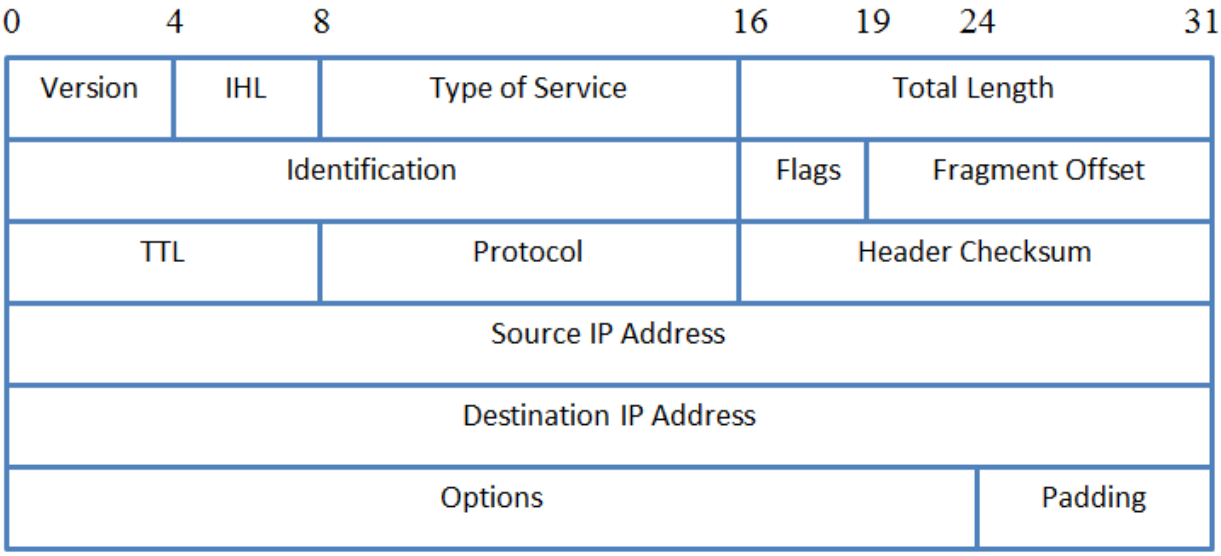
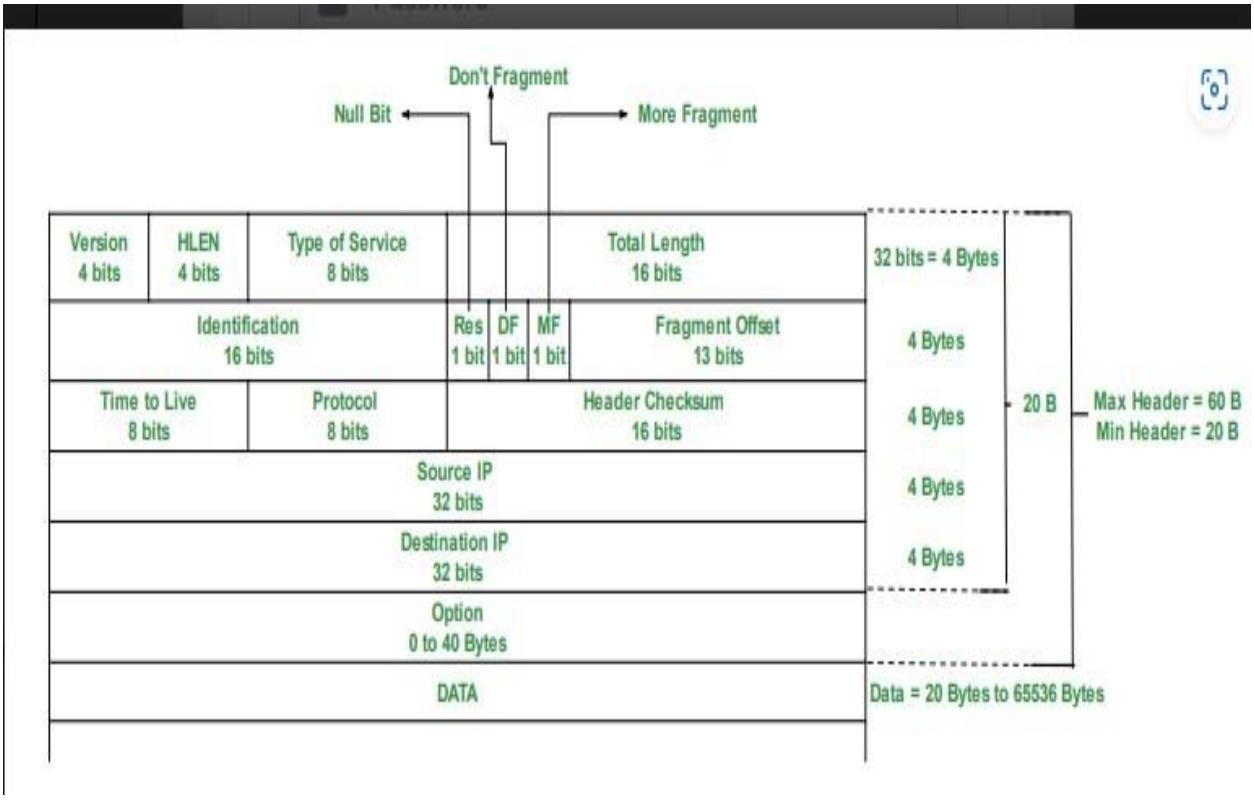
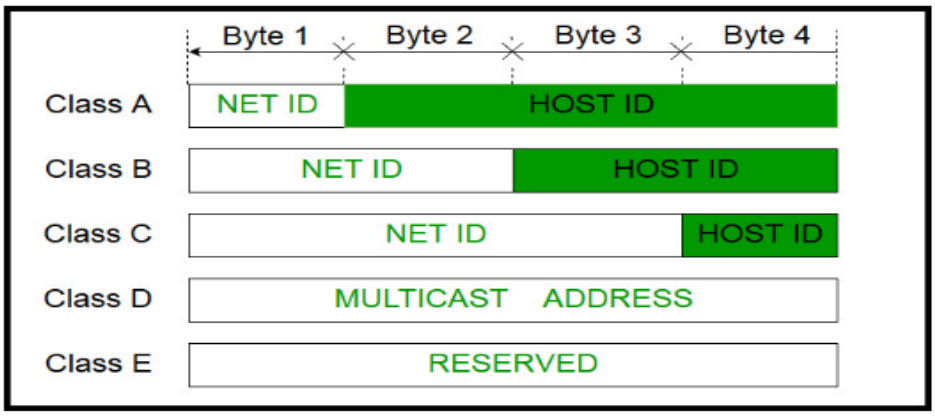
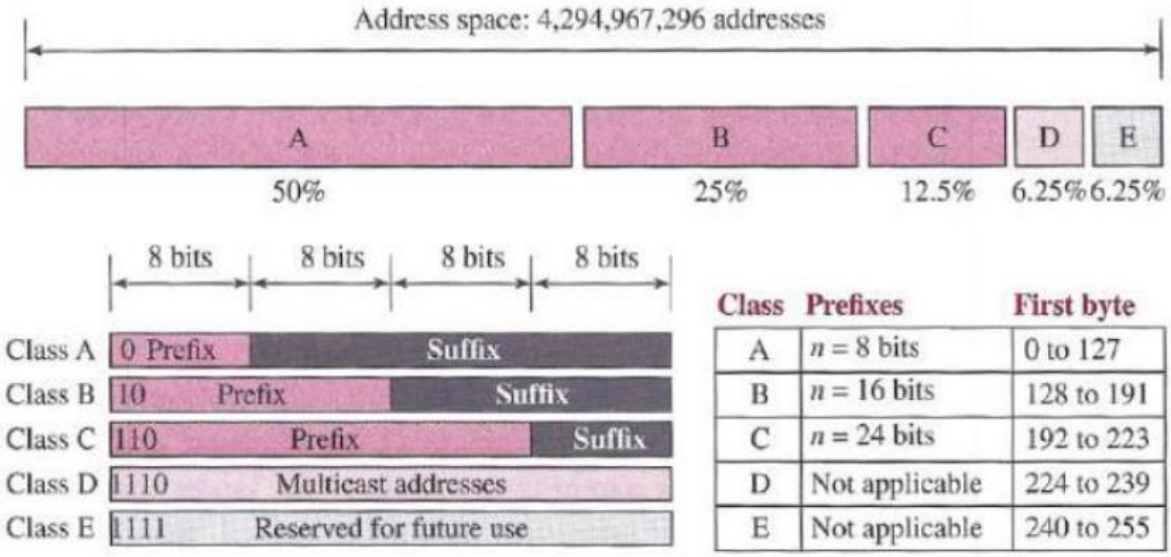


Fig: IPv4 Frame Format







Class	Prefixes	First byte
A	$n = 8$ bits	0 to 127
B	$n = 16$ bits	128 to 191
C	$n = 24$ bits	192 to 223
D	Not applicable	224 to 239
E	Not applicable	240 to 255

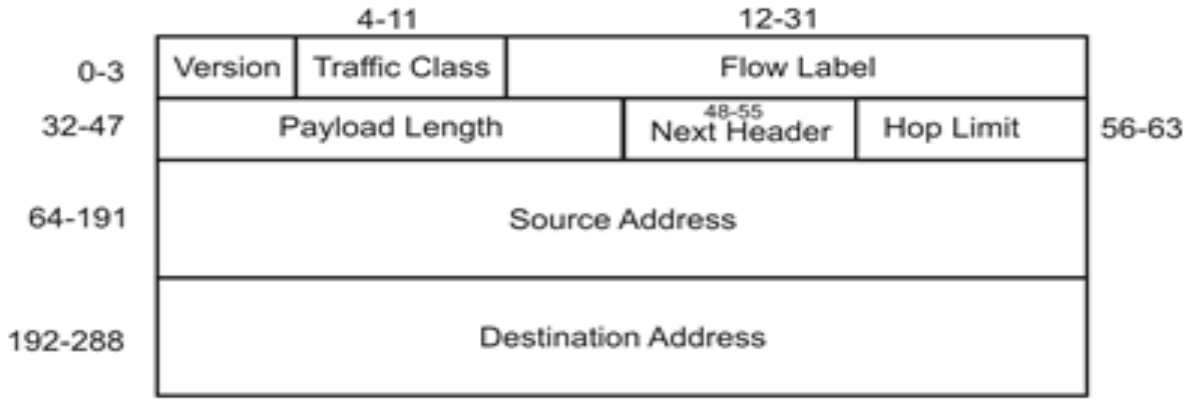
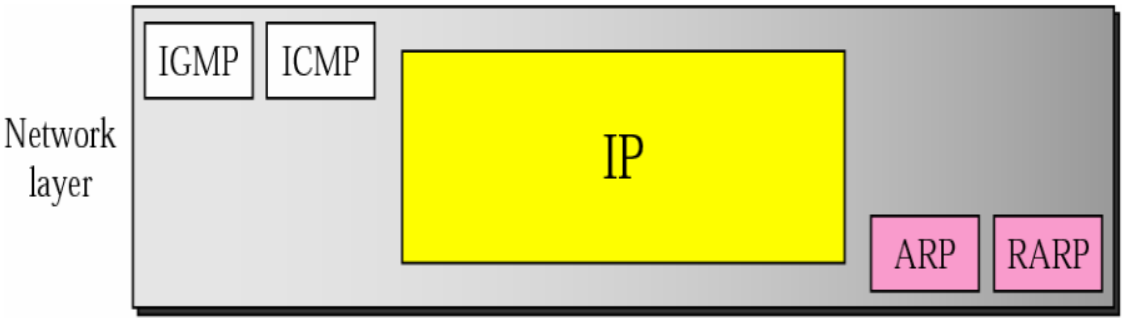


Fig 4.20.1 : IPv6 Fixed Header

Position of ARP and RARP in TCP/IP Protocol Suite



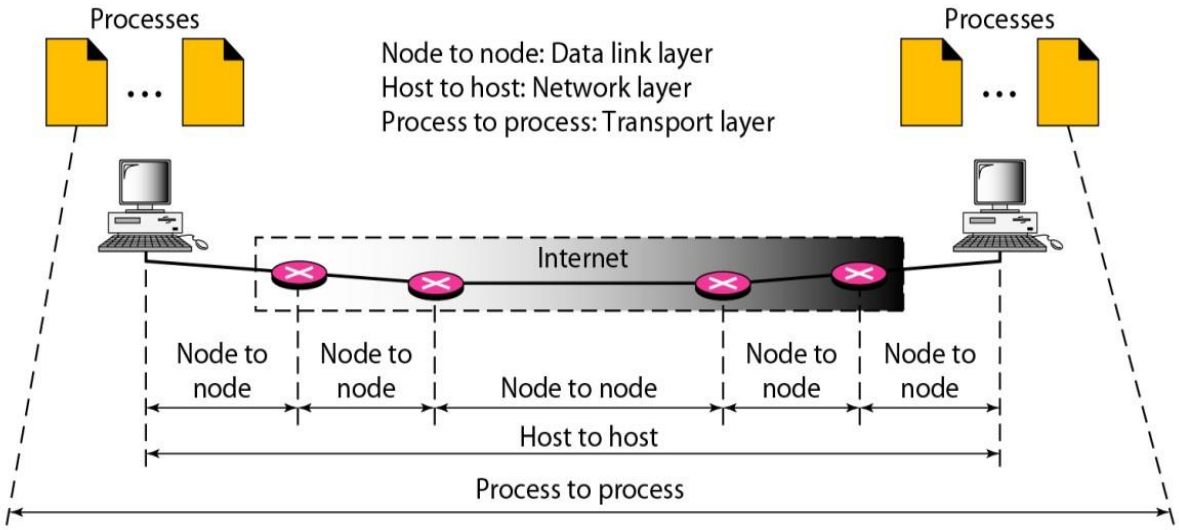
ARP Packet

Hardware Type		Protocol Type
Hardware length	Protocol length	Operation Request 1, Reply 2
Sender hardware address (For example, 6 bytes for Ethernet)		
Sender protocol address (For example, 4 bytes for IP)		
Target hardware address (For example, 6 bytes for Ethernet) (It is not filled in a request)		
Target protocol address (For example, 4 bytes for IP)		

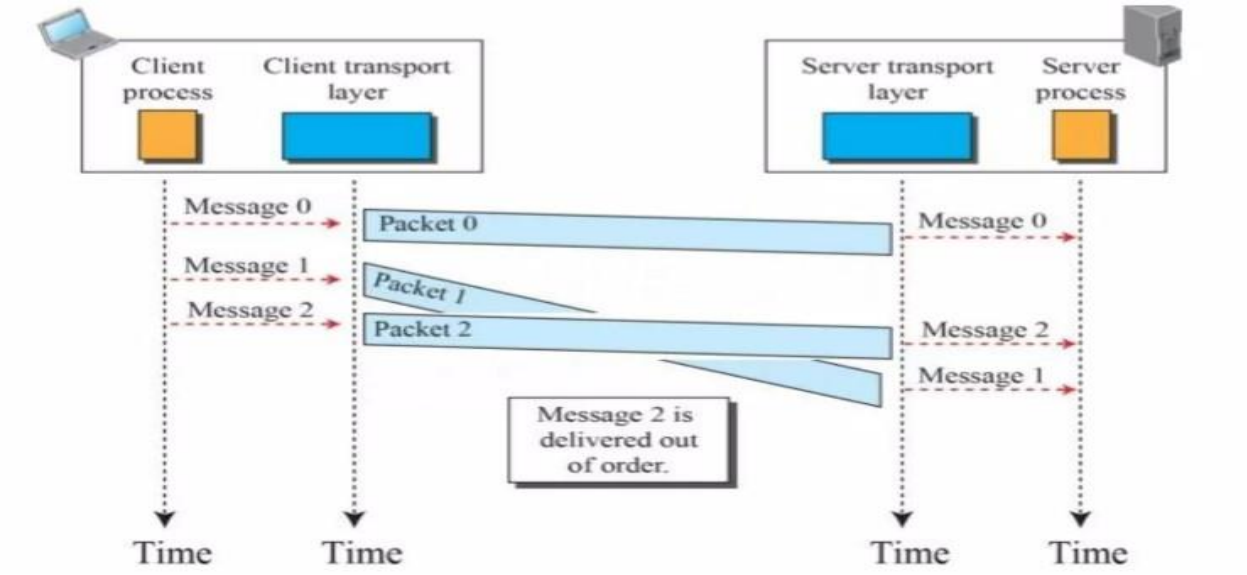
RARP packet

Hardware type		Protocol type
Hardware length	Protocol length	Operation Request 3, Reply 4
Sender hardware address (For example, 6 bytes for Ethernet)		
Sender protocol address (For example, 4 bytes for IP) (It is not filled for request)		
Target hardware address (For example, 6 bytes for Ethernet) (It is not filled for request)		
Target protocol address (For example, 4 bytes for IP) (It is not filled for request)		

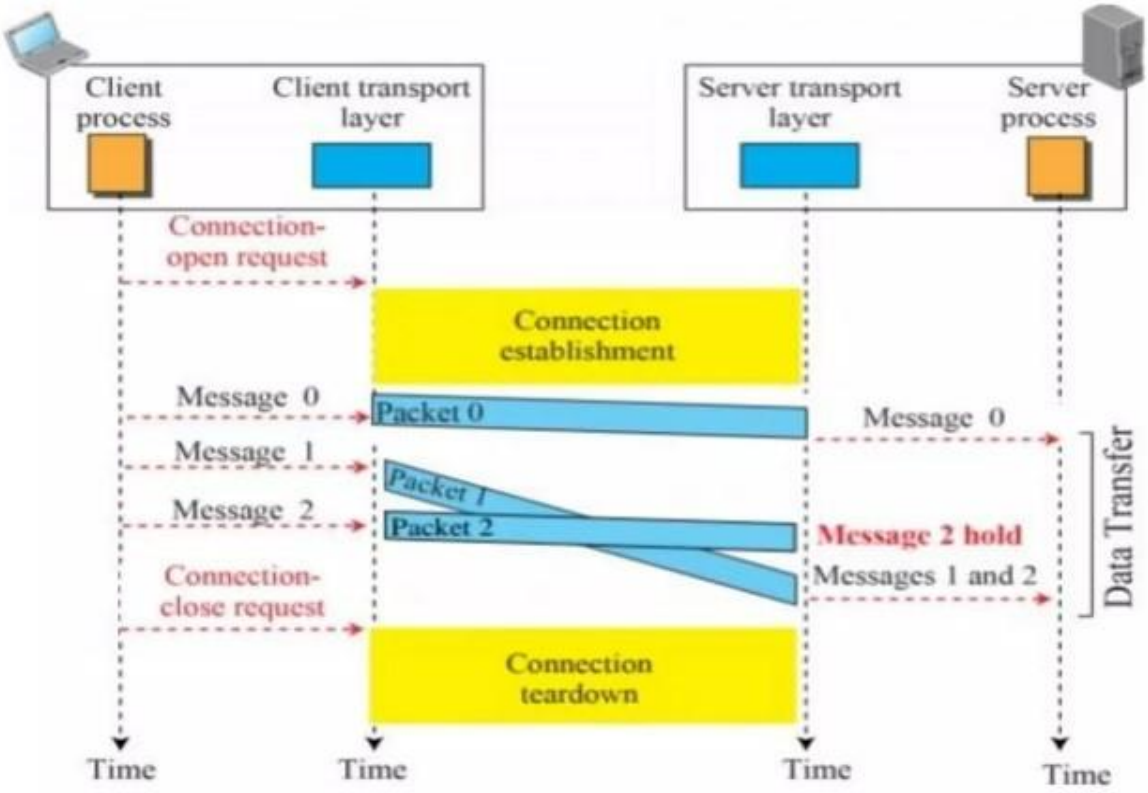
Module-5

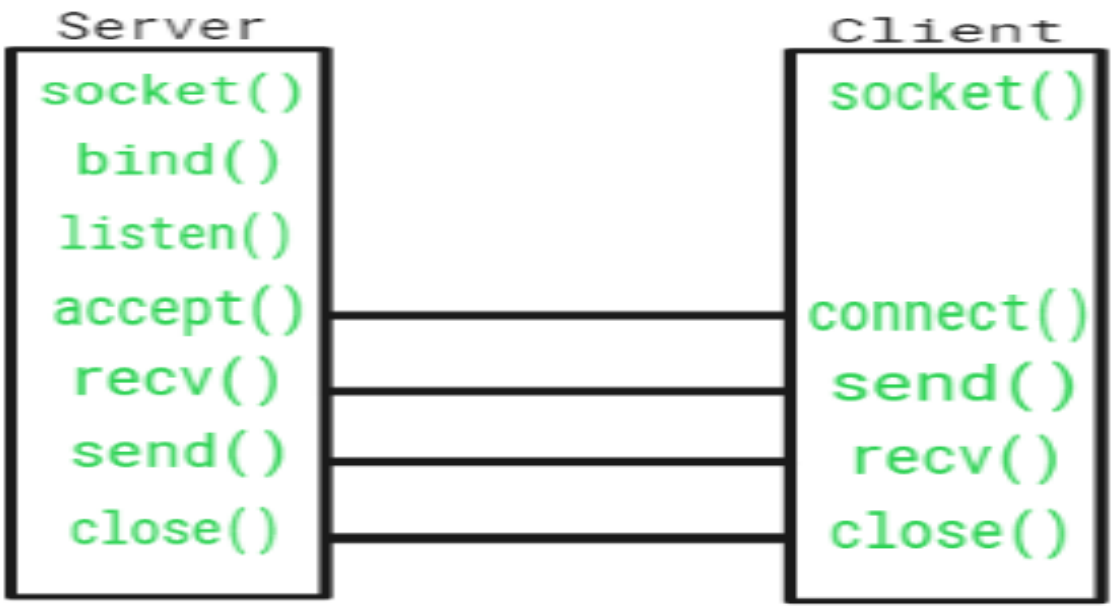


Connectionless

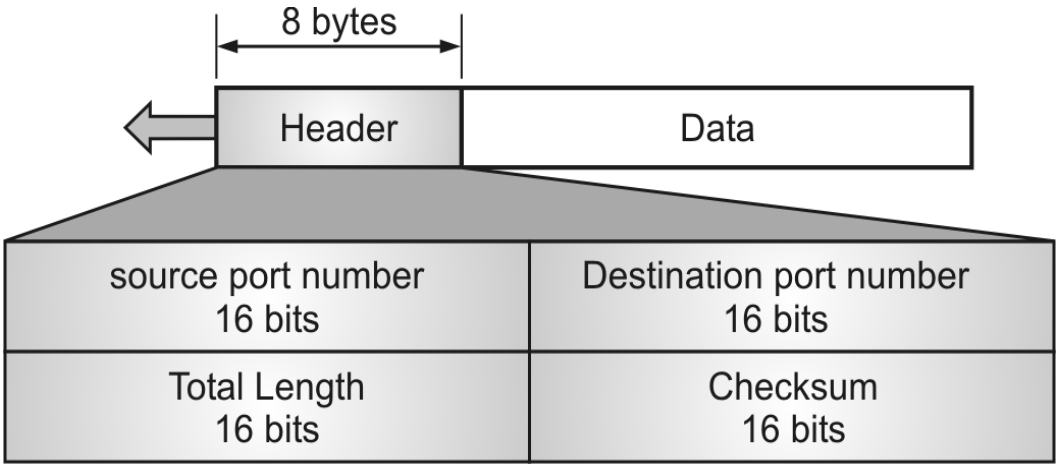


Connection oriented

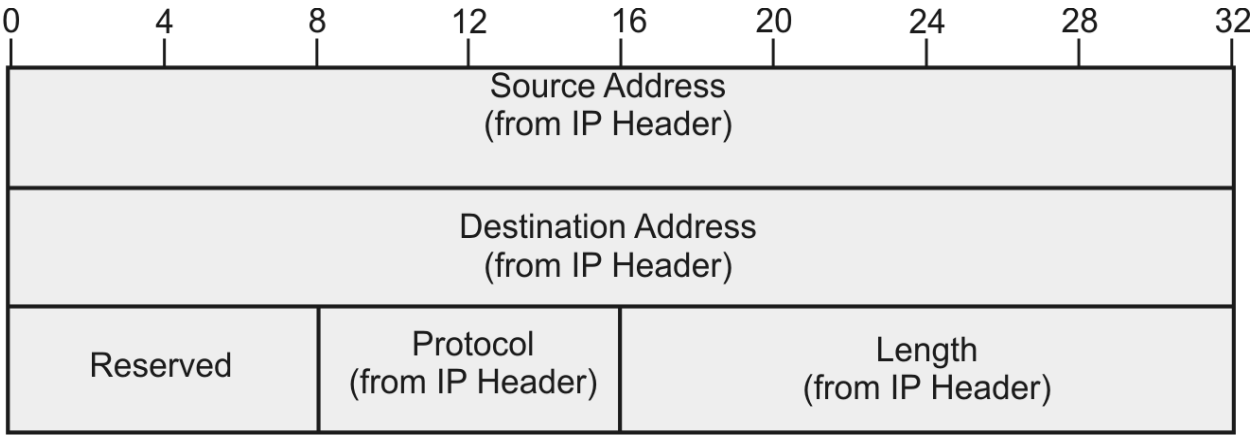




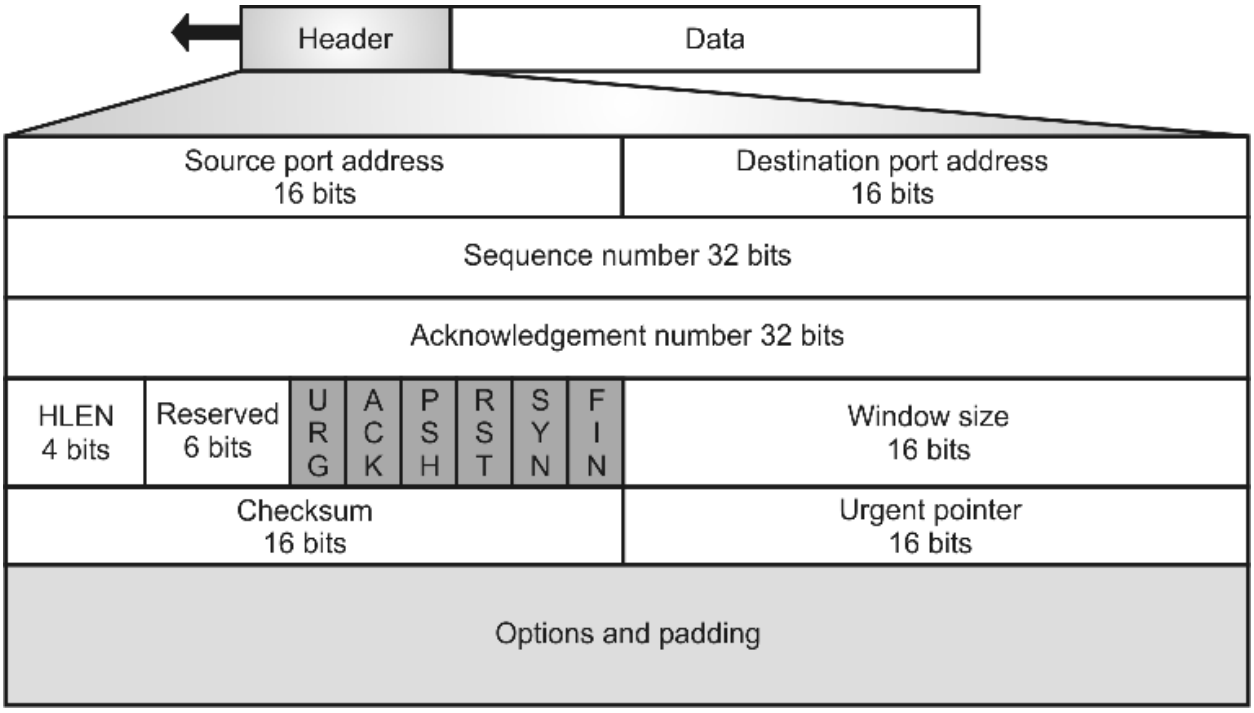
UDP header

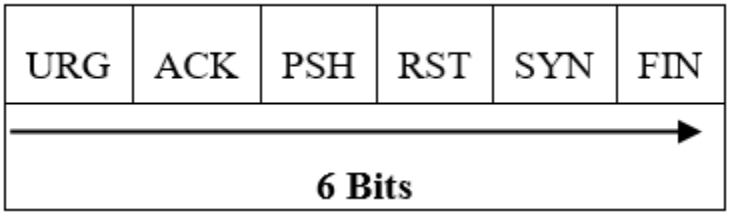


UDP pseudo header

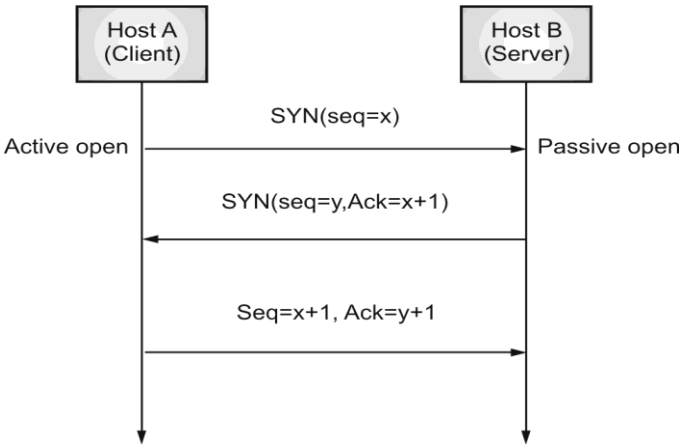


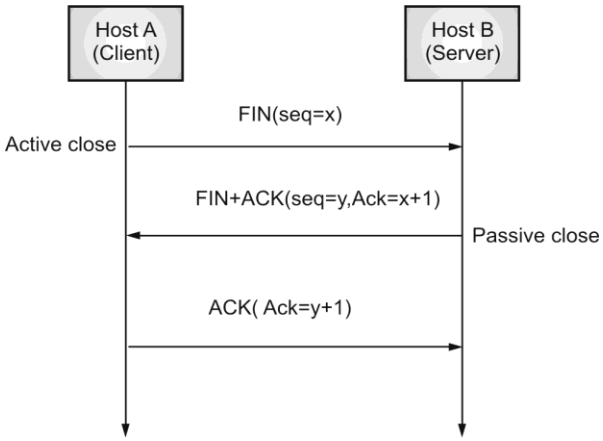
TCP segment header



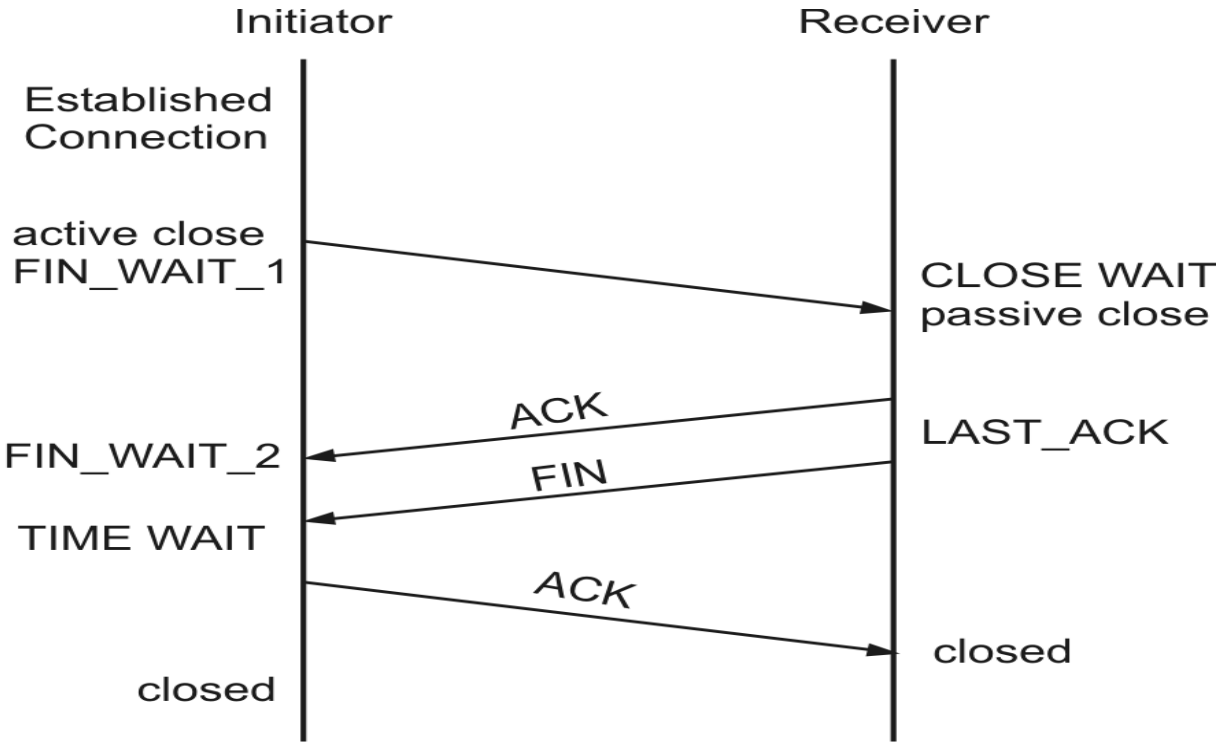


Three way handshake

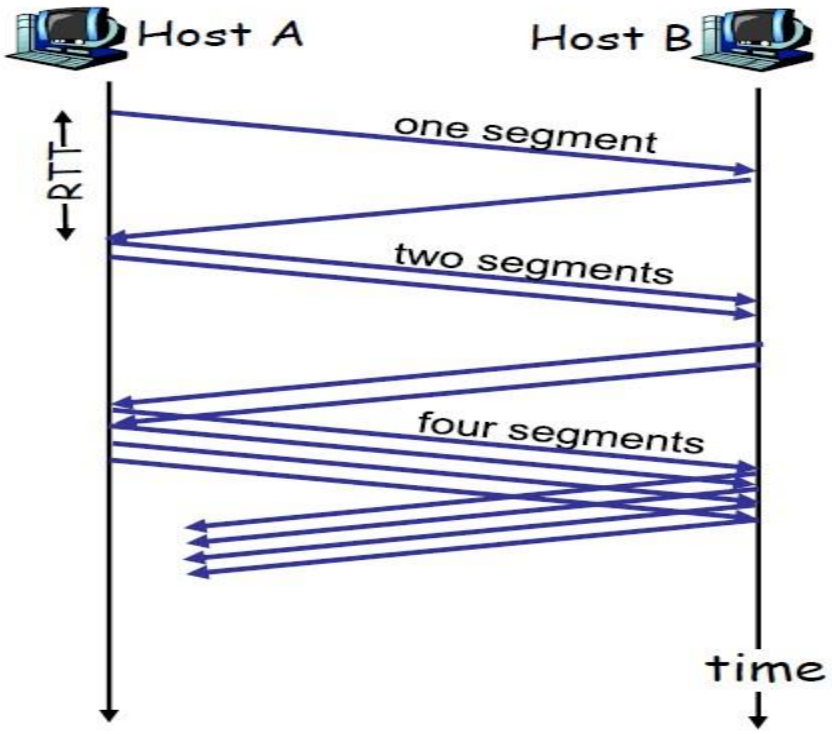




4 way handshake



TCP slow start



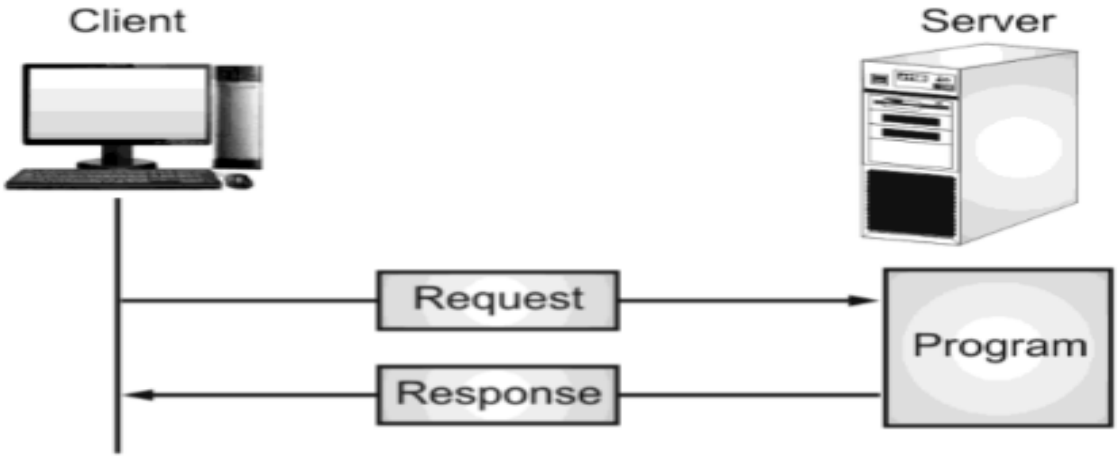


Fig. 5.1.9 : HTTP Transaction

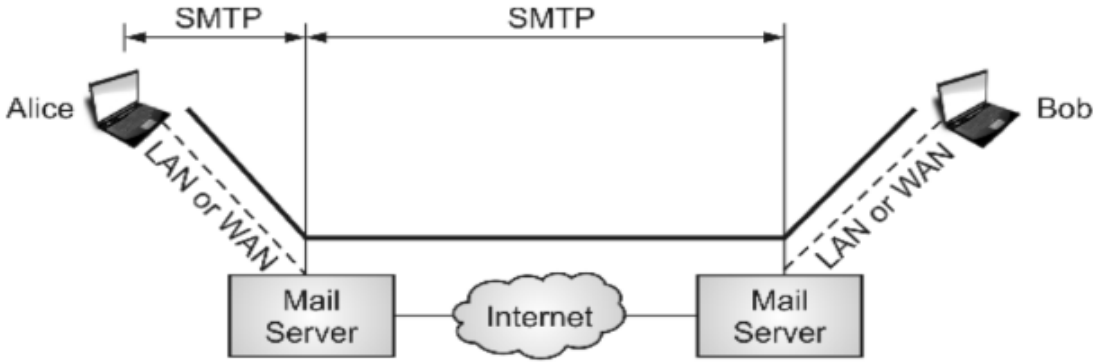


Fig. 5.3.7 : Range of SMTP Protocol

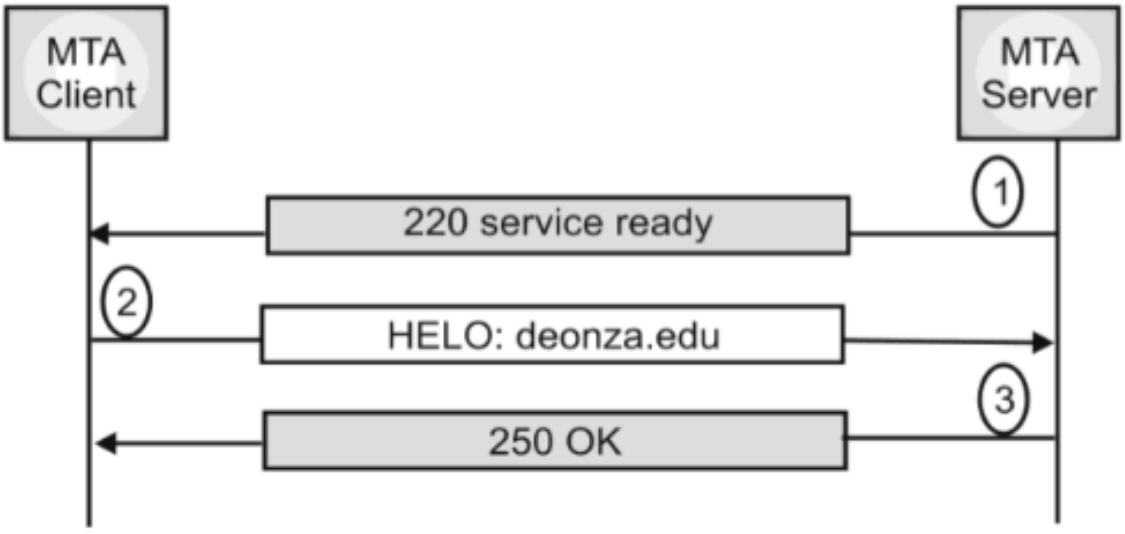
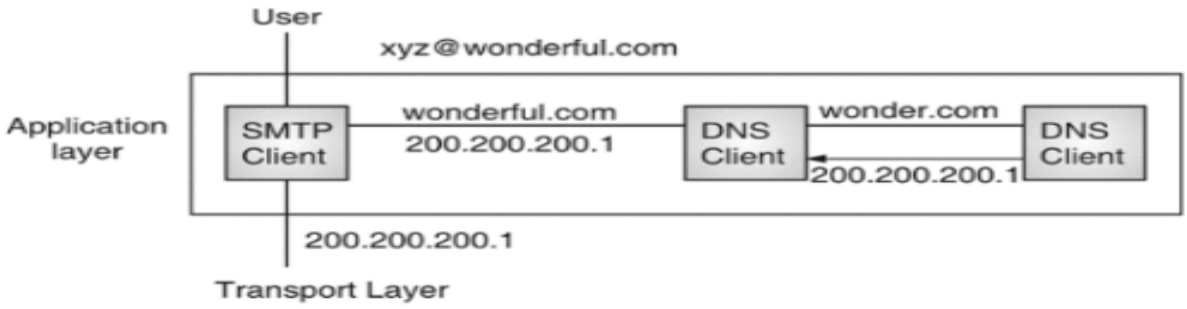


Fig. 5.3.13 : Connection Establishment in SMTP



SMTP - Simple Mail Transfer Protocol (e-mail
SMTP - Domain Name System

Fig. 5.4.1 : Example of DNS

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